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EXAMINER
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UNITED STATES DEPARTMENT OF COMMERCE
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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Paper No. 20

Application Number: 08/825400
Filing Date: 3/28/97
Appellant(s): Haruhiko Murata et al.

Johnny Kumar
For Appellant

EXAMINER'S ANSWER

This is in response to appellant's brief on appeal filed 3/29/99.

(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) *Summary of Invention*

The summary of invention contained in the brief is correct.

(6) *Issues*

The appellant's statement of the issues in the brief is substantially correct. The changes are as follows: Whether claims 1 and 12 are patentable under 35 U.S.C. §102(e) over Degani et al. (US 5564617) and whether claims 2-4 are patentable under 35 U.S.C. §103(a) over Degani et al.

(7) *Grouping of Claims*

Appellant's brief includes a statement that claims 1-4 and 12 stand or fall together.

(8) *Claims Appealed*

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

US 5,564,617

Degani et al. (hereafter Degani)

10/15/1996

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371⁶ of this title before the invention thereof by the applicant for patent.

Claims 1 and 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Degani.

Degani discloses a substrate (reference number 32) having a joining surface (top surface of substrate); and a plurality of solder bumps disposed on the joining surface of the substrate in such a manner as to form a predetermined profiled line or surface pattern, wherein the solder bumps have tops which are free, unconnected, flat and leveled. (see Fig.s 3 and 5) Degani further discloses the width or diameter of the tops of the bumps to be substantially equal to that of the pads and the height of the solder bumps to be smaller than the diameter of the pads.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art

are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Degani as applied to claim 1 above.

Degani discloses the claimed invention except for the shape of the pads; however, various shaped, including circular, pads are known in the art of circuit board connections. It would have been obvious to one having ordinary skill in the art at the time the invention was made to choose any known shape, including circular, as the shape of the pad, as it has been held that a mere change in shape involves only routine skill in the art. *In re Dailey*, 149 USPQ (CCPA 1976)

As to claim 3, the above modified Degani structure discloses the claimed invention except for the limitation the tops of the solder bumps are smaller in diameter than the pads. Solder bumps of various shapes, including ones wherein the top surface is smaller in diameter than the pad to which the it is joined, are known in the art of circuit board connections. It would have been obvious to one having ordinary skill in the art at the time the invention was made to choose any known solder bump, including one having a top surface which has a diameter smaller than that of the pad to which it is joined, as it has been held that a mere change in shape involves only routine skill in the art. *In re Dailey*, 149 USPQ (CCPA 1976)

(11) Response to Argument

Appellant argues that the invention is patentable over Degani, because balls and bumps are synonymous and examiner admits in the interview summary that Degani does not show balls.

Examiner first notes that there is no clear commitment in the interview summary record

of 1/14/99 on this issue. Examiner stated that the change "appears" to overcome the reference but that "actual determination" cannot be made. As such, the comments in the interview summary record are not binding on the examiner.

The Degani reference clearly shows a substrate (32) with solder bumps (36) on the joining surface such that they form a predetermined profile line, and the bumps have a free, unconnected, leveled and flat surface as clearly depicted in the illustrations of Degani, for example figure 3.

Furthermore, examiner had not concluded from the disclosure that solder bumps and solder balls are used synonymous. In view of appellant's admission in the brief that balls and bumps are used interchangeably (page 4 of brief dated 3/29/99, paragraph 1) and thus are synonymous, further consideration reveals that this is problematic. The word "bump" means "[a] small swelling or lump," (Webster's II New Riverside University Dictionary, ©1994) and the term lump means "[a]n irregularly shaped piece or mass[;] [a] small cube, as of sugar." the term "ball" means "[a] spherical or almost spherical body." (Webster's II New Riverside University Dictionary, ©1994) To the extent that ball is interpreted as a spherical object and bump has an irregular shape, these terms are inconsistent and are not synonymous.

The arguments on page 3 of the brief appear to be the preamble to the argument at page 4 (addressed above) and have not been addressed separately. Further, none of the features mentioned in the arguments on page 3 are in the claims. Thus, these arguments are moot.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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May 10, 1999

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